Normoxemia and Pulmonary Embolism

To the Editor:

In 1971, Szucs et al. reported a series of 50 nonconsecutive angiographically proven cases of pulmonary embolism (PE), all of which with \( \text{PaO}_2 < 50 \text{ mm Hg} \), i.e., "hypoxemia." They concluded that normoxemia effectively excludes the diagnosis of PE. In succeeding issues of CHEST, there quickly followed a dozen or more well-documented exceptions to this rule. This was one of the first of many such "failed tests" to exclude PE.

In more recent years, further retrospective studies of nonconsecutive patients have been cited emphasizing the limitations of blood gas analysis in this context. One of the most commonly quoted articles was based on the Prospective Investigation of Pulmonary Embolism Diagnosis Study findings. Stein et al. concluded that blood gas levels are of insufficient discriminant value to permit the exclusion of the diagnosis of PE in about 30% of patients without prior cardiopulmonary disease. However from Paul Stein’s book, containing unpublished background material, we learn that only 132 of 330 patients (40%) with PE and no prior cardiopulmonary disease actually had their blood gas levels measured while breathing room air. Since this was a small series of nonconsecutive patients, the calculation of sensitivity and specificity appears inappropriate.

To date, only three studies have prospectively studied the incidence of normoxemia in patients with PE. Egermayer et al. found objective evidence of PE in 5 of 39 patients (13%). Prediletto et al. observed normoxemia in 14 of 312 consecutive patients (4%) with angiographic evidence of PE. In another recent study, only 5 of 49 consecutive patients (10%) with high-probability ventilation/perfusion lung scan results and an intermediate pretest probability had normoxemia.

PE is a complex and often poorly defined disease, and it is doubtful that any one test will ever completely rule in or rule out the diagnosis. However, in my opinion, blood gas analysis is a useful part of the workup, and it is clear that normoxemia greatly diminishes the pretest probability of PE, and may exclude clinically important events.

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Editor’s note: Dr. Egermayer died subsequent to receipt of this letter.

REFERENCES

6. Stein PD. Pulmonary embolism. Baltimore, MD: Williams & Wilkins, 1997; 80